EXTENSION OF AN OUTFALL SEWER.

A very interesting method for the extension seawards of an outfall sewer is described by Mr. John S. Brodie, M. Inst. C.E., borough engineer and surveyor of Blackpool, England, in a paper read recently at the conference of engineers and surveyors, held in connection with the annual congress of the Royal Sanitary Institute at York. The following abstracts are taken from the paper:

The old outfall at Gynn, Blackpool, was 1,304 feet in

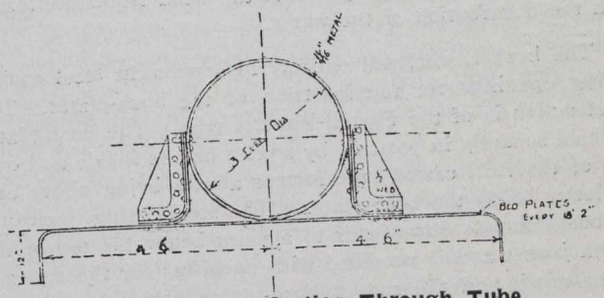

Fig. 1.—Cross Section Through Tube.

length, and consisted of cast-iron flanged pipes, 3 feet internal diameter, in 6-ft. lengths, bolted together and supported on timber piles and cradles. This outfall was laid in 1898, at the cost of £6,755, or at the rate of £15 10s. 9d. per linear yard. The work in 1898 was carried out by a contractor, and was never really completed to its intended length, which was 1,400 lin. ft., on the ground that the difficulties in connection with stormy seas and deepening water were so great that further extension was impracticable. Since then, sand banks have formed seaward of the old outlet, and it has been found necessary, in order to

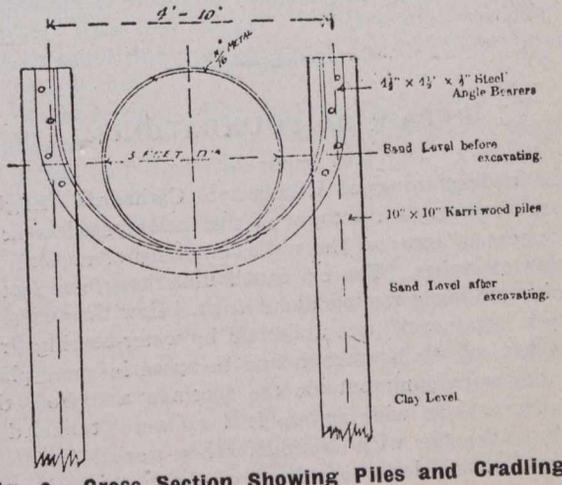

Fig. 2.—Cross Section Showing Piles and Cradling to Receive Connecting End of Tube.

prevent the sewage from lodging on the foreshore, to extend the outfall across the recently formed sand banks into deep water, seaward of the same.

The present extension has been made by means of a continuous steel tube, 3 ft. internal diameter, of solid welded pipes, in 18-ft. lengths, formed of open hearth steel, 11/16 in. thick, riveted together with cover straps 10 in. wide, 11/16 in. of thickness, with a double row of ⅞-in. rivets, spaced 3 in. centre to centre. The quality of the steel was such that the ultimate tensile breaking stress averaged 26 tons per square inch, with an ultimate elongation of 20 per cent. in 8 in. The whole of the tube, both inside and outside, has been heavily coated with an improved bituminous preservative. In order that the new tube should fit properly on to the flanged end of the old outfall, 10-in. square Karri wood piles were driven on each side of the trench at intervals of 6 ft. centre to centre, and connected by half-timber walings, to which close timbering, 3 in. thick, was secured, for a distance of 86 ft. seaward of the old outlet. The tube was built up for a total length of 600 ft., in the foreshore above highwater mark, at a distance of 3 miles along the coast line from its ultimate destination. In order that, when laid, the tube should not be subject to a rolling or rocking action on the sea bottom, caused by heavy on-shore gales, transverse steel bed-plates, 9 ft. long by 12 in. wide, and 11/16 in. in thickness, turned down at the ends for a length of 12 in., as shown in Fig. 1, were riveted to the tubes at 18 ft. centres, except for the 86 ft. length referred to

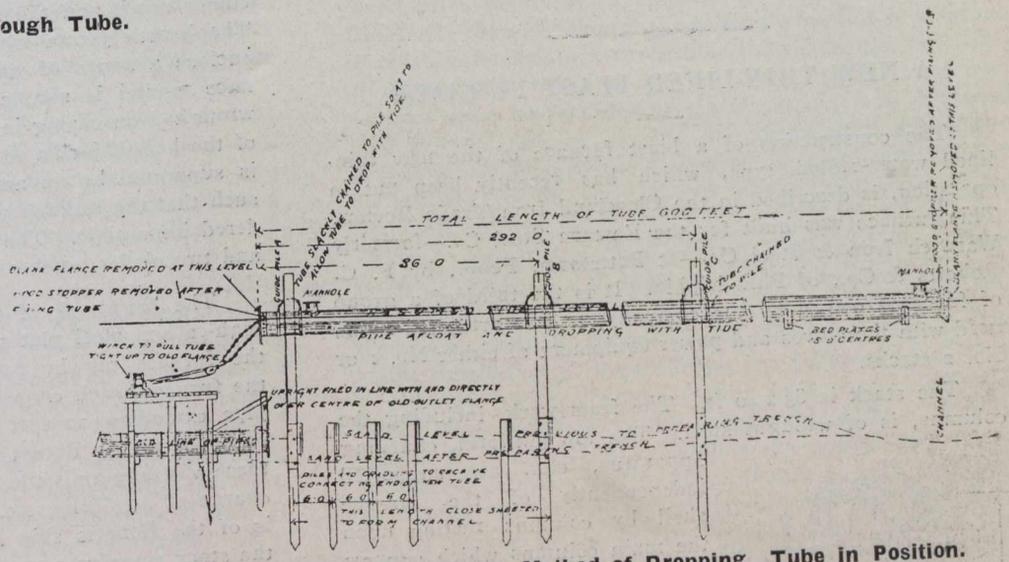

Fig. 3.—Longitudinal Section Showing Method of Dropping Tube in Position.

above where the tube rests on the Karri wood and steel cradles.

After being completed, the tube, which is provided with a 24-in. manhole and cover at each end, and also with blank flanges at the open ends, was filled with water and tested to a pressure of 50 lb. per square inch, at which pressure it was found to be perfectly tight. Timber watertight stoppers, easily removable, were then inserted at each end of the tube, close to the manholes above referred to, and caulked up watertight. The blank flanges were then securely fastened to the ends of the tube, and the manhole covers on the two manholes, one at each end, were also secured and made perfectly watertight. The tube was then launched from above high-water down the foreshore, to such a level between high and low water marks as would enable it to float with a 24-ft. spring tide. It was then floated into the sea, and towed by means of a steam tug for a distance of 3 miles, and was adjusted at high water over the trench, by means of guide piles, as shown in Fig. 3, where it was ultimately intended to lie. The blank flanges at both ends were then removed, the temporary stoppers maintaining the tube afloat. On the tide receding, the tube dropped down into its permanent position, the flow of sewage being held up temporarily by the shore penstock valves; the shoreward-end flange was then bolted up to the flange of the old cast-iron pipe, by means of 12 1⅛-in. steel bolts, and so secured